

### **REMARKS**

Applicant appreciates the thorough examination of the present application as evidenced by the Office Action of May 10, 2006 (hereinafter, "Office Action") and the Final Office Action of October 31, 2006 (hereinafter, "Final Action"). In particular, Applicant appreciates the indication of allowable subject matter in Claims 1, 5-14, 27, 29, and 30.

In response, Applicant has canceled Claims 61-87 to simplify the remaining issues for consideration. In addition, Applicant has rewritten independent Claim 21 in dependent form to depend from Claim 15. Applicant wishes to note that the recitations of Claim 21 as amended correspond to the recitations of Claim 21 as originally filed, and that Claim 21 was rewritten in independent form pursuant to the indication of allowable subject matter therein in the Office Action of May 10, 2006. As such, Applicant submits that the recitations of Claim 21 were examined in the Office Action of May 10, 2006, and that the present amendment thereof raises no further issues. Moreover, Claim 21 is patentable at least per the patentability of Claim 15 from which it depends, as will be discussed below. Accordingly, entry of this amendment after final is respectfully requested.

Thus, the remaining issues for consideration relate to the patentability of Claims 15-19 and 21-26. Accordingly, Applicant respectfully requests reconsideration of the rejections of these claims in view of the comments that follow.

#### **The Drawing Objections**

Figure 1 of the present application has been objected to for failing to be designated as prior art. *See* Final Action, Page 3. In response, Applicant has amended Figure 1 to include the designation "Prior Art". A corrected drawing sheet reflecting this amendment is provided herewith, and is labeled as "Replacement Sheet" in compliance with the requirements of 37 CFR 1.84(c) and 37 CFR 1.121(d). No new matter has been added. Accordingly, Applicant respectfully requests withdrawal of the objection to the drawings.

#### **The Section 102 Rejections**

Claims 15, 16, 18, 19, 22, and 23 stand rejected under 35 U.S.C §102(e) as anticipated

by U.S. Patent Application Publication No. 2003/0209741 to Saitoh et al. (hereinafter "Saitoh"). Claim 15, for example, recites:

15. A silicon carbide metal-oxide semiconductor field effect transistor, comprising:  
a drift layer of n-type silicon carbide;  
first regions of p-type silicon carbide in close proximity to the drift layer;  
**a first region of n-type silicon carbide disposed between peripheral edges of the first regions of p-type silicon carbide;**  
second regions of n-type silicon carbide within the first regions of p-type silicon carbide, wherein the second regions of n-type silicon carbide have a carrier concentration greater than a carrier concentration of the drift layer and are spaced apart from the peripheral edges of the first regions of p-type silicon carbide;  
an oxide layer on the drift layer, the first region of n-type silicon carbide and the second regions of n-type silicon carbide;  
**third regions of n-type silicon carbide disposed beneath the first regions of p-type silicon carbide and between the first regions of p-type silicon carbide and the drift layer,** wherein the third regions of n-type silicon carbide have a carrier concentration greater than the carrier concentration of the drift layer, and **wherein the first region of n-type silicon carbide** has a higher carrier concentration than a carrier concentration of the drift layer and **has a lower carrier concentration than the carrier concentration of the third regions of n-type silicon carbide;**  
source contacts on portions of the second regions of n-type silicon carbide;  
a gate contact on the oxide layer; and  
a drain contact on the drift layer opposite the oxide layer. (*Emphasis added*).

The Final Action asserts that Saitoh discloses all of the recitations of Claim 15. *See* Final Action, Page 3. In particular, with reference to Figure 1 of Saitoh, the Final Action asserts that Saitoh discloses "a first region of n-type silicon carbide (11b) disposed between peripheral edges of the first regions (12) of p-type silicon carbide" and "third regions of n-type silicon carbide (11a) disposed beneath the first regions of p-type silicon carbide (12)". Final Action, Page 4.

However, Applicant respectfully submits that Saitoh does not disclose or suggest a first region of n-type silicon carbide that "has a lower carrier concentration than the carrier concentration of the third regions of n-type silicon carbide", as recited by Claim 15. As an

initial matter, Applicant notes that Figure 1 of Saitoh does not illustrate the first region of n-type silicon carbide region **11b** described in the Final Action; rather, the region **11b** has been added by the Examiner as an upper portion of n-type region **11a**, as shown in the Examiner-modified FIG. 1' on Page 5 of the Final Action. *See* Final Action, Page 5. However, even if the regions **11b** and **11a** were considered as the first and third regions of n-type silicon carbide recited by Claim 15, nowhere does Saitoh disclose or suggest that the region **11b** *has a lower carrier concentration* than the region **11a**. In other words, Saitoh does not disclose or suggest that an n-type region **11b** disposed between peripheral edges of p-type silicon carbide regions **12** has a lower carrier concentration than an n-type region **11a** disposed beneath the p-type silicon carbide regions **12**. *See* Saitoh, Fig. 1 and Final Action, Page 5.

Accordingly, Applicant submits that Saitoh does not disclose or suggest all of the recitations of Claim 15. Thus, Applicant respectfully submits that Claim 15 is patentable over Saitoh for at least the above reasons. In addition, dependent Claims 16-19 and 21-26 are patentable at least per the patentability of Claim 15 from which they depend. If the Examiner wishes to maintain the rejection of Claim 15 based on the teachings of Saitoh, Applicant respectfully requests that the Examiner point to specific portions of Saitoh that describe that "the first region of n-type silicon carbide ...has a lower carrier concentration than the carrier concentration of the third regions of n-type silicon carbide", as recited by Claim 15.

### **The Section 103 Rejections**

Claims 15, 17, 21, and 24 also stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent Application Publication No. 2002/0038891 to Ryu et al. (hereinafter "Ryu") in view of Saitoh. For example, the Final Action asserts that Ryu discloses many of the recitations of Claim 15, but concedes that Ryu does not disclose or suggest a first region of n-type silicon carbide between peripheral edges of the p-type regions **20** and third regions of n-type silicon carbide beneath the p-type regions **20**, wherein the first regions of n-type silicon carbide have a lower carrier concentration than the third regions. *See* Final Action, Pages 9-10 and Ryu, Fig. 7. As such, the Final Action relies on Saitoh as disclosing these recitations. *See* Final Action, Page 10. In particular, with reference to Examiner-modified

FIG. 1', the Final Action asserts that Saitoh discloses first regions of n-type silicon carbide **11b** between peripheral edges of p-type regions **12** and third regions of n-type silicon carbide **11a** beneath the p-type regions **12**. *See* Final Action, Pages 5 and 10.

However, Applicants respectfully submit that Saitoh fails to disclose or suggest that "the first region of n-type silicon carbide ...has a lower carrier concentration than the carrier concentration of the third regions of n-type silicon carbide", as recited by Claim 15. In particular, as discussed above with reference to the Section 102 rejections, nowhere does Saitoh disclose or suggest that an n-type region **11b** (added in Examiner-modified FIG. 1' on Page 5 of the Final Action) between edges of the p-type regions **12** *has a lower carrier concentration* than the n-type region **11a** beneath the p-type regions **12**. *See* Saitoh, Fig. 1 and Final Action, Page 5.

Thus, Applicant respectfully submits that neither Ryu nor Saitoh disclose or suggest at least the recitations of Claim 15 discussed above. Accordingly, Applicant submits that Claim 15 is patentable over the combination of Ryu and Saitoh for at least the above reasons. In addition, dependent Claims 16-19 and 21-26 are patentable at least per the patentability of Claim 15 from which they depend.

**Entry of Applicant's Supplemental Amendment is Requested**

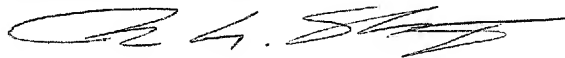
Applicant notes that a Supplemental Amendment including new dependent Claims 88 and 89 (which respectively depend from allowed Claims 1 and 27) was filed on September 8, 2006, well before the issuance of the Final Action; however, this Supplemental Amendment does not appear to have been entered. As such, Applicant hereby respectfully requests entry of the Supplemental Amendment of September 8, 2006, as it was properly filed prior to the Final Action, no new matter was added, and the new dependent claims included therein are patentable at least per the patentability of allowed Claims 1 and 27.

In re: Sei-Hyung Ryu  
Serial No.: 10/698,170  
Filed: October 30, 2003  
Page 13

**Conclusion**

Accordingly, Applicant submits that pending Claims 1, 5-19, 21-26, 27, 29, and 30 are in condition for allowance, which is respectfully requested. Applicant encourages the Examiner to telephone the undersigned at 919-854-1400 in order to resolve any outstanding issues.

Respectfully submitted,

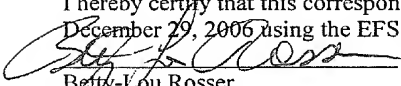


Rohan G. Sabapathypillai  
Registration No. 51,074

**USPTO Customer No. 65106**  
Myers Bigel Sibley & Sajovec  
Post Office Box 37428  
Raleigh, North Carolina 27627  
Telephone: 919/854-1400  
Facsimile: 919/854-1401

**CERTIFICATION OF ELECTRONIC TRANSMISSION  
UNDER 37 CFR § 1.8**

I hereby certify that this correspondence is being transmitted electronically to the U.S. Patent and Trademark Office on  
December 29, 2006 using the EFS.



Betty-Lou Rosser

Date of Signature: December 29, 2006